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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/597,809

03/27/2007

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1010-00400

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10/15/2009

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EXAMINER

INGHAM, JOHN C

ART UNIT

PAPER NUMBER

2814

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DELIVERY MODE

10/15/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/597,809	<b>Applicant(s)</b> FISHER ET AL.	
	<b>Examiner</b> JOHN C. INGHAM	<b>Art Unit</b> 2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 26 June 2009.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,2,7-11,13,14 and 17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,7-11,13,14 and 17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims **1, 2, 7-11, 13, 14** are rejected under 35 U.S.C. 102(b) as being anticipated by Mizushima (US 2002/0017642).

3. Regarding claims **1 and 13**, Mizushima discloses in Fig 7 a semiconductor device and a method of manufacture comprising a substrate (Fig 1 item 1) of a first semiconductor material (Si) and a compound layer (Fig 1 item 2) of said first semiconductor material and a second semiconductor material (SiGe) disposed on the substrate, the ratio of the first material to the second material of the compound layer being decreased (q3, Si decreases) away from the substrate towards the upper surface of the compound layer, wherein the rate of decrease of the ratio varies linearly on opposite sides of an intermediate point disposed within the layer (2) at which the rate varies (rate of Si decrease in q2 is different than rate of Si decrease in q3).

4. Regarding claims **2 and 14**, Mizushima discloses in Fig 7 the device of claims 1 and 13, in which the rate of decrease of the ratio increases away from the substrate towards the surface of the compound layer (rate of q2 is less than rate of q3).

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5. Regarding claim **7**, Mizushima discloses in Fig 7 the device of claim 1, in which a final layer (Fig 2 item 4) comprising said first material (Si) is deposited on the surface of the compound layer (2).

6. Regarding claims **8 and 9**, Mizushima discloses the device of claim 1, in which the first material is silicon and the second material is germanium.

7. Regarding claims **10 and 11**, Mizushima discloses the device of claim 1, in which the composition of the compound layer at the upper surface thereof (upper surface of SiGe at q3) comprises substantially 20% of said second material (Ge content is 0.225).

### ***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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10. Claim **17** is rejected under 35 U.S.C. 103(a) as being unpatentable over Mizushima and Murthy (US 6,723,622).

11. Mizushima discloses the method of claim 13, but does not specify wherein the ratio of the first material to the second material of the compound layer is decreased in part by decreasing a temperature at which the layer is deposited from the substrate towards the surface of the compound layer.

12. Murthy teaches that decreasing the ratio of silicon to germanium in a graded composition layer (compound layer) is accomplished by also decreasing the temperature at which the layer is deposited, in order to produce a layer with low defect density (col 3 ln 8-13). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the teachings of Murthy in order to produce a layer with low defect density.

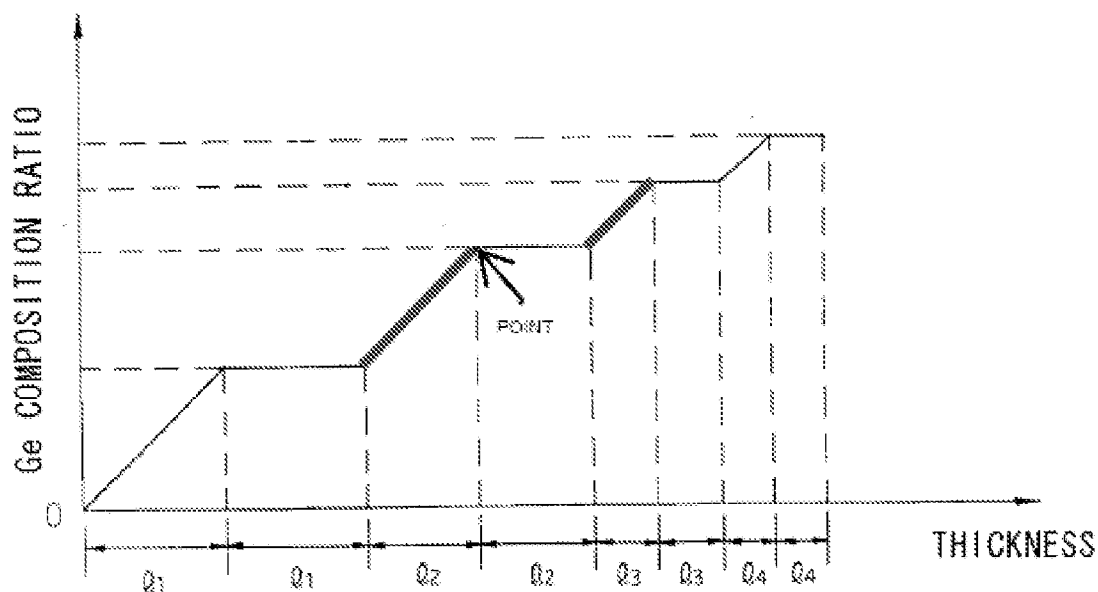
### ***Response to Arguments***

13. Applicant's arguments filed 26 June 2009 have been fully considered but they are not persuasive.

14. Regarding the argument on page 5 that the decrease of the ratio does not vary linearly on opposite sides of a point. The claim language does not preclude a constant value on one side of the point, since a constant value is a linear value. Moreover, if a point is picked between the sloped section q2 and the constant section q2 in Fig 7 of Mizushima, reproduced below, then the sloped section of q2 and the sloped section of q3 are on opposite sides of the point, and clearly vary from each other (relevant

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sections of drawing with thicker lines) as claimed. However, the sloped section of q2 and the constant section of q2 also vary, and both are linear (e.g. the slope of each is a constant, linear value). Therefore all of the claimed limitations are met: wherein the ratio of the compound layer decreases from the substrate to the upper surface, wherein the rate of decrease varies (i.e. is different) linearly opposite sides of an intermediate point.

**FIG. 7**

### **Conclusion**

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Yamazaki (US 5,440,152 Fig 6) shows two distinct rates of Ge concentration from 500nm to 300nm. Shiono (US 7405,142 Fig 9) shows two distinct rates of Ge concentration in areas 32 and 3.

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16. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOHN C. INGHAM whose telephone number is (571)272-8793. The examiner can normally be reached on M-F, 8am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Wael M Fahmy/  
Supervisory Patent Examiner, Art Unit 2814

John C Ingham  
Examiner  
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